

What is claimed is:

1. A PDP firing furnace for firing a substrate of plasma display panel, comprising:

gas distribution piping laid in one direction within  
5 said firing furnace and having a plurality of openings arranged along said one direction, said gas distribution piping being further constructed such that gas containing oxygen is supplied via both end portions of said gas distribution piping and said gas is supplied to an inside of  
10 said firing furnace through said openings; and

gas exhaust piping for exhausting gas from within said firing furnace,

said firing furnace being further constructed such that said openings become larger in directions from both end  
15 portions to a central portion of said gas distribution piping, or said gas distribution piping becomes finer in directions from said both end portions to said central portion of said gas distribution piping.

2. The PDP firing furnace according to claim 1,  
20 wherein said gas distribution piping has a separator plate in said central portion of said gas distribution piping.

3. A PDP firing furnace for firing a substrate of plasma display panel, comprising:

gas distribution piping laid in one direction within  
25 said firing furnace and having a plurality of openings arranged along said one direction, said gas distribution piping being further constructed such that gas containing oxygen is supplied via both end portions of said gas

distribution piping and said gas is supplied to an inside of said firing furnace through said openings; and

gas exhaust piping for exhausting gas from within said firing furnace,

5        said firing furnace being further constructed such that said openings formed between both end portions and a central portion of said gas distribution piping are larger than said openings formed in said both end portions and central portion, or portions of said gas distribution piping  
10      between said both end portions and central portion become finer than said both end portions and central portion of said gas distribution piping.

4. The PDP firing furnace according to claim 3, wherein said gas distribution piping has a separator plate  
15      in said central portion of said gas distribution piping.

5. A PDP firing furnace for firing a substrate of plasma display panel, comprising:

gas distribution piping laid in one direction within said firing furnace and having a plurality of openings  
20      arranged along said one direction, said gas distribution piping being further constructed such that gas containing oxygen is supplied via one end portion of said gas distribution piping and said gas is supplied to an inside of said firing furnace through said openings; and

25      gas exhaust piping for exhausting gas from within said firing furnace,

      said firing furnace being further constructed such that said openings become larger in directions from both end

portions of said gas distribution piping to a portion  
between said both end portions, or said gas distribution  
piping becomes finer in directions from said both end  
portions of said gas distribution piping to said portion  
5 between said both end portions.

6. The PDP firing furnace according to claim 5,  
wherein said gas distribution piping has a separator plate  
in said central portion of said gas distribution piping.

7. A PDP firing furnace for firing a substrate of  
10 plasma display panel, comprising:

gas distribution piping for supplying gas containing  
oxygen to an inside of said firing furnace; and

15 gas exhaust piping laid in one direction within said  
firing furnace and having a plurality of openings arranged  
along said one direction, said gas exhaust piping being  
further constructed such that gas is exhausted via both end  
portions of said gas exhaust piping to exhaust gas from  
within said firing furnace through said openings,

20 said firing furnace being further constructed such  
that said openings become larger in directions from both end  
portions to a central portion of said gas exhaust piping, or  
said gas exhaust piping becomes finer in directions from  
said both end portions to central portion of said gas  
exhaust piping.

25 8. The PDP firing furnace according to claim 7,  
wherein said gas exhaust piping has a separator plate in  
said central portion of said gas exhaust piping.

9. A PDP firing furnace for firing a substrate of

plasma display panel, comprising:

gas distribution piping for supplying gas containing oxygen to an inside of said firing furnace; and

5       gas exhaust piping laid in one direction within said firing furnace and having a plurality of openings arranged along said one direction, said gas exhaust piping being further constructed such that gas is exhausted via both end portions of said gas exhaust piping to exhaust gas from within said firing furnace through said openings,

10       said firing furnace being further constructed such that said openings formed between both end portions and a central portion of said gas exhaust piping are larger than said openings formed in said both end portions and central portion, or portions of said gas exhaust piping between said 15      both end portions and central portion are finer than said both end portions and central portion of said gas exhaust piping.

10. The PDP firing furnace according to claim 9, wherein said gas exhaust piping has a separator plate in 20      said central portion of said gas exhaust piping.

11. A PDP firing furnace for firing a substrate of plasma display panel, comprising:

gas distribution piping for supplying gas containing oxygen to an inside of said firing furnace; and

25       gas exhaust piping laid in one direction within said firing furnace and having a plurality of openings arranged along said one direction, said gas exhaust piping being further constructed such that gas is exhausted via both end

portions of said gas exhaust piping to exhaust gas from within said firing furnace through said openings,

5 said firing furnace being further constructed such that said openings become larger in directions from both end portions of said gas exhaust piping to a portion between said both end portions, or said gas exhaust piping becomes finer in directions from said both end portions of said gas exhaust piping to said portion between said both end portions.

10 12. The PDP firing furnace according to claim 11, wherein said gas exhaust piping has a separator plate in said central portion of said gas exhaust piping.

13. A PDP firing furnace for firing a substrate of plasma display panel, comprising:

15 gas distribution piping laid in one direction within said firing furnace and having a plurality of openings arranged along said one direction, said gas distribution piping being further constructed such that gas containing oxygen is supplied via one end portion of said gas distribution piping and said gas is supplied to an inside of said firing furnace through said openings; and

20 gas exhaust piping for exhausting gas from within said firing furnace,

25 said firing furnace being further constructed such that said openings become larger in directions from both end portions of said gas distribution piping to a portion between said both end portions, or said gas distribution piping becomes finer in directions from said both end

portions of said gas distribution piping to said portion between said both end portions.

14. A PDP firing furnace for firing a substrate of plasma display panel, comprising:

5       gas distribution piping for supplying gas containing oxygen to an inside of said firing furnace; and

      gas exhaust piping laid in one direction within said firing furnace and having a plurality of openings arranged along said one direction, said gas exhaust piping being 10 further constructed such that gas is exhausted via one end portion of said gas exhaust piping to exhaust gas from within said firing furnace through said openings,

      said firing furnace being further constructed such that said openings become larger in a direction from said 15 one end portion, through which said gas is exhausted, to the other end portion of said gas exhaust piping, or said gas exhaust piping becomes finer in a direction from said one end portion, through which said gas is exhausted, to the other end portion of said gas exhaust piping.

20       15. The PDP firing furnace according to claim 1, wherein said openings have a shape of circle, ellipse or rectangle.

      16. The PDP firing furnace according to claim 1, further comprising:

25       a carrier unit for transporting said substrate; a plurality of furnace compartments arranged along a direction of movement of said substrate and allowing said substrate to pass sequentially through an inside of said

furnace compartments; and

a heating unit for heating said substrate,  
wherein said gas distribution piping and gas exhaust  
piping are laid in a direction orthogonal to said direction  
5 of movement of said substrate or in the same direction as  
said direction of movement of said substrate within said  
firing furnace.

17. A method of manufacturing a plasma display panel,  
comprising the steps of:

10 forming a paste layer made of a transparent  
conductive material on a first substrate and firing said  
paste layer to form a transparent electrode;

15 forming a paste layer made of a transparent  
dielectric material over said transparent electrode and  
firing said paste layer to form a transparent dielectric  
layer;

20 forming electrodes on a second substrate;  
forming a paste layer made of a dielectric material  
over said electrodes and firing said paste layer to form a  
dielectric layer;

forming a paste layer made of a barrier rib material  
on said dielectric layer and firing said paste layer to form  
barrier ribs; and

25 forming a paste layer made of a phosphor material on  
at least one of said dielectric layer and side faces of said  
barrier ribs and firing said paste layer to form phosphor  
layers,

said method being further constructed such that in at

least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming said barrier ribs, and the step of forming said phosphor 5 layers, said firing of said paste layer is carried out within the firing furnace described in claim 1.

18. A method of manufacturing a plasma display panel, comprising the steps of:

forming a paste layer made of a transparent 10 conductive material on a first substrate and firing said paste layer to form a transparent electrode;

forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric 15 layer;

forming electrodes on a second substrate;

forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

20 forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

25 forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

said method being further constructed such that in at least one of the step of forming said transparent electrode,

the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming said barrier ribs, and the step of forming said phosphor layers, said firing of said paste layer is carried out  
5 within the firing furnace described in claim 3.

19. A method of manufacturing a plasma display panel, comprising the steps of:

forming a paste layer made of a transparent conductive material on a first substrate and firing said  
10 paste layer to form a transparent electrode;

forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric layer;

15 forming electrodes on a second substrate;

forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

20 forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

25 forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

said method being further constructed such that in at least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the

step of forming said dielectric layer, the step of forming said barrier ribs, and the step of forming said phosphor layers, said firing of said paste layer is carried out within the firing furnace described in claim 5.

5        20. A method of manufacturing a plasma display panel, comprising the steps of:

          forming a paste layer made of a transparent conductive material on a first substrate and firing said paste layer to form a transparent electrode;

10       forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric layer;

          forming electrodes on a second substrate;

15       forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

20       forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

          forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

25       said method being further constructed such that in at least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming

said barrier ribs, and the step of forming said phosphor layers, said firing of said paste layer is carried out within the firing furnace described in claim 7.

21. A method of manufacturing a plasma display panel,  
5 comprising the steps of:

forming a paste layer made of a transparent conductive material on a first substrate and firing said paste layer to form a transparent electrode;

10 forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric layer;

forming electrodes on a second substrate;

15 forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

20 forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

25 said method being further constructed such that in at least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming said barrier ribs, and the step of forming said phosphor

layers, said firing of said paste layer is carried out within the firing furnace described in claim 9.

22. A method of manufacturing a plasma display panel, comprising the steps of:

5 forming a paste layer made of a transparent conductive material on a first substrate and firing said paste layer to form a transparent electrode;

10 forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric layer;

15 forming electrodes on a second substrate;

20 forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

25 forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

30 forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

35 said method being further constructed such that in at least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming said barrier ribs, and the step of forming said phosphor layers, said firing of said paste layer is carried out

within the firing furnace described in claim 11.

23. A method of manufacturing a plasma display panel, comprising the steps of:

5 forming a paste layer made of a transparent conductive material on a first substrate and firing said paste layer to form a transparent electrode;

10 forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric layer;

forming electrodes on a second substrate;

forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

15 forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

20 forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

25 said method being further constructed such that in at least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming said barrier ribs, and the step of forming said phosphor layers, said firing of said paste layer is carried out within the firing furnace described in claim 13.

24. A method of manufacturing a plasma display panel, comprising the steps of:

forming a paste layer made of a transparent conductive material on a first substrate and firing said 5 paste layer to form a transparent electrode;

forming a paste layer made of a transparent dielectric material over said transparent electrode and firing said paste layer to form a transparent dielectric layer;

10 forming electrodes on a second substrate;

forming a paste layer made of a dielectric material over said electrodes and firing said paste layer to form a dielectric layer;

15 forming a paste layer made of a barrier rib material on said dielectric layer and firing said paste layer to form barrier ribs; and

20 forming a paste layer made of a phosphor material on at least one of said dielectric layer and side faces of said barrier ribs and firing said paste layer to form phosphor layers,

said method being further constructed such that in at least one of the step of forming said transparent electrode, the step of forming said transparent dielectric layer, the step of forming said dielectric layer, the step of forming 25 said barrier ribs, and the step of forming said phosphor layers, said firing of said paste layer is carried out within the firing furnace described in claim 14.